

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re United States Patent Application of:

Applicant: Nuesch, et al.

Application No.: 10/069,056

Date Filed: February 11, 2002

Title: PARVOVIRUS NS 1 VARIANTS

Docket No.: 4121-136

Examiner: Not yet assigned.

Group Art Unit: Not yet assigned.



23448

PATENT & TRADEMARK OFFICE

EXPRESS MAIL CERTIFICATE

It hereby is certified by the person identified below that the attached documents are being mailed to the Commissioner of Patents on the date specified, in an envelope addressed to the Commissioner of Patents, Box PCT, Washington, D.C. 20231, and Express Mailed under the provisions of 37CFR 1.10.

Katrina Holland
Katrina Holland

June 20, 2002

Date of Mailing

EL544952114US

Express Mail Label Number

STATEMENT OF IDENTITY UNDER 27 C.F.R. §1.821 (f)

Commissioner for Patents
Box PCT
Washington, D.C. 20231

Sir:

I hereby state that I have prepared the paper copy of the document titled "SEQUENCE LISTING.st25.txt" and recorded such document on computer readable form on June 14, 2002, and that information recorded in computer readable form is identical to that on the paper copy of sequence listing submitted.

Respectfully submitted,

Marianne Fuierer

Marianne Fuierer

Reg. No. 39,983

Attorney for Applicants

INTELLECTUAL PROPERTY/
TECHNOLOGY LAW
P.O. Box 14329
Research Triangle Park, NC 27709
Telephone: (919) 419-9350
Fax: (919) 419-9354
Attorney Ref: 4121-136

SEQUENCE LISTING

<110> Nuesch, Jurg
 Rommelaere, Jean

<120> Parvovirus NS 1 Variants

<130> 4121-136

<140> 10/069,056

<141> 2002-02-11

<150> PCT/EP00/07835

<151> 2000-08-11

<150> EP 99 115 161.4

<151> 1999-08-13

<160> 18

<170> PatentIn version 3.1

<210> 1

<211> 2019

<212> DNA

<213> wildtype Parvovirus NS1

<400> 1
 atggctggaa atgcttactc tgatgaagtt ttgggagcaa ccaactgggt aaaggaaaaa 60
 agtaaccagg aagtgttctc atttgttttt aaaaatgaaa atgttcaact gaatggaaaa 120
 gatatcggat ggaatagtta caaaaaagag ctgcaggagg acgagctgaa atctttacaa 180
 cgaggagcgg aaactacttg ggaccaaagc gaggacatgg aatgggaaac cacagtggat 240
 gaaatgacca aaaagcaagt attcattttt gattcttttg ttaaaaaatg tttatttgaa 300
 gtgcttaaca caaagaatat atttcctggt gatgttaatt ggtttgca acatgaatgg 360
 ggaaaagacc aaggctggca ctgccatgta ctaattggag gaaaggactt tagtcaagct 420
 caagggaaat ggtggagaag gcaactaaat gtttactgga gcagatgggt ggtaacagcc 480
 tgtaatgtgc aactaacacc agctgaaaga attaaactaa gagaaatagc agaagacaat 540
 gagtgggtta ctctacttac ttataagcat aagcaacca aaaaagacta taccaagtgt 600
 gttctttttg gaaacatgat tgcttactat tttttaacta aaaagaaaat aagcactagt 660
 ccaccaagag acggaggcta ttttcttagc agtgactctg gctggaaaac taacttttta 720
 aaagaaggcg agcgccatct agtgagcaaa ctatacactg atgacatgcg gccagaaacg 780
 gttgaaacca cagtaaccac tgcgcaggaa actaagcgcg gcagaattca aactaaaaaa 840
 gaagtttcta ttaaaactac acttaaagag ctggtgcata aaagagtaac ctcaccagag 900
 gactggatga tgatgcagcc agacagttac attgaaatga tggctcaacc aggtggagaa 960
 aacctgctga aaaatacgct agagatttgt acactaactc tagccagaac caaaacagca 1020
 tttgacttaa ttttagaaaa agctgaaacc agcaactaa ccaacttttc actgcctgac 1080
 acaagaacct gcagaatttt tgcttttcat ggctggaact atgttaaagt ttgcatgctt 1140
 atttgtgtg ttttaaacag acaaggaggc aaaagaaata ctgttttatt tcatggacca 1200
 gccagcacag gcaaattctat tattgcacaa gccatagcac aagcagttgg caatgttggt 1260

```

tgctataatg cagccaatgt aaactttcca tttaatgact gtaccaacaa gaacttgatt 1320
tggttagaag aagctggtaa ccttggacag caagtaaac agtttaagc catttgctt 1380
gggtcaacta ttcgcattga tcaaaaagga aaaggcagca aacagattga accaacacca 1440
gtcatcatga ccacaaatga gaacattaca gtggtcagaa taggctgcga agaaagacca 1500
gaacacactc aaccaatcag agacagaatg cttaacattc atctaacaca taccttgctt 1560
ggtgactttg gtttggttga caaaaatgaa tggcccatga tttgtgcttg gttggtaaag 1620
aatggttacc aatctaccat ggcaagctac tgtgctaaat ggggcaaagt tcctgattgg 1680
tcagaaaact gggcggagcc aaagggtgcca actcctataa atttactagg ttcggcacgc 1740
tcaccattca cgacaccgaa aagtacgcct ctgagccaga actatgcact aactccactt 1800
gcatcggatc tcgaggacct ggctttagag ccttggagca caccaaatac tcctgttgcg 1860
ggcactgcag aaaccagaa cactggggaa gctggttcca aagcctgcca agatgggtcaa 1920
ctgagcccaa cttggtcaga gatcgaggag gatttgagag cgtgcttcgg tgcggaaccg 1980
ttgaagaaag acttcagcga gccgctgaac ttggactaa 2019

```

```

<210> 2
<211> 672
<212> PRT
<213> wildtype Parvovirus NS1

```

```
<400> 2
```

```
Met Ala Gly Asn Ala Tyr Ser Asp Glu Val Leu Gly Ala Thr Asn Trp
1          5          10          15

```

```
Leu Lys Glu Lys Ser Asn Gln Glu Val Phe Ser Phe Val Phe Lys Asn
20          25          30

```

```
Glu Asn Val Gln Leu Asn Gly Lys Asp Ile Gly Trp Asn Ser Tyr Lys
35          40          45

```

```
Lys Glu Leu Gln Glu Asp Glu Leu Lys Ser Leu Gln Arg Gly Ala Glu
50          55          60

```

```
Thr Thr Trp Asp Gln Ser Glu Asp Met Glu Trp Glu Thr Thr Val Asp
65          70          75          80

```

```
Glu Met Thr Lys Lys Gln Val Phe Ile Phe Asp Ser Leu Val Lys Lys
85          90          95

```

```
Cys Leu Phe Glu Val Leu Asn Thr Lys Asn Ile Phe Pro Gly Asp Val
100         105         110

```

```
Asn Trp Phe Val Gln His Glu Trp Gly Lys Asp Gln Gly Trp His Cys
115         120         125

```

```
His Val Leu Ile Gly Gly Lys Asp Phe Ser Gln Ala Gln Gly Lys Trp
130         135         140

```

Trp Arg Arg Gln Leu Asn Val Tyr Trp Ser Arg Trp Leu Val Thr Ala
 145 150 155 160

Cys Asn Val Gln Leu Thr Pro Ala Glu Arg Ile Lys Leu Arg Glu Ile
 165 170 175

Ala Glu Asp Asn Glu Trp Val Thr Leu Leu Thr Tyr Lys His Lys Gln
 180 185 190

Thr Lys Lys Asp Tyr Thr Lys Cys Val Leu Phe Gly Asn Met Ile Ala
 195 200 205

Tyr Tyr Phe Leu Thr Lys Lys Lys Ile Ser Thr Ser Pro Pro Arg Asp
 210 215 220

Gly Gly Tyr Phe Leu Ser Ser Asp Ser Gly Trp Lys Thr Asn Phe Leu
 225 230 235 240

Lys Glu Gly Glu Arg His Leu Val Ser Lys Leu Tyr Thr Asp Asp Met
 245 250 255

Arg Pro Glu Thr Val Glu Thr Thr Val Thr Thr Ala Gln Glu Thr Lys
 260 265 270

Arg Gly Arg Ile Gln Thr Lys Lys Glu Val Ser Ile Lys Thr Thr Leu
 275 280 285

Lys Glu Leu Val His Lys Arg Val Thr Ser Pro Glu Asp Trp Met Met
 290 295 300

Met Gln Pro Asp Ser Tyr Ile Glu Met Met Ala Gln Pro Gly Gly Glu
 305 310 315 320

Asn Leu Leu Lys Asn Thr Leu Glu Ile Cys Thr Leu Thr Leu Ala Arg
 325 330 335

Thr Lys Thr Ala Phe Asp Leu Ile Leu Glu Lys Ala Glu Thr Ser Lys
 340 345 350

Leu Thr Asn Phe Ser Leu Pro Asp Thr Arg Thr Cys Arg Ile Phe Ala
 355 360 365

Phe His Gly Trp Asn Tyr Val Lys Val Cys His Ala Ile Cys Cys Val
 370 375 380

Leu Asn Arg Gln Gly Gly Lys Arg Asn Thr Val Leu Phe His Gly Pro
 385 390 395 400

Ala Ser Thr Gly Lys Ser Ile Ile Ala Gln Ala Ile Ala Gln Ala Val
 405 410 415

Gly Asn Val Gly Cys Tyr Asn Ala Ala Asn Val Asn Phe Pro Phe Asn
 420 425 430

Asp Cys Thr Asn Lys Asn Leu Ile Trp Val Glu Glu Ala Gly Asn Phe
 435 440 445

Gly Gln Gln Val Asn Gln Phe Lys Ala Ile Cys Ser Gly Gln Thr Ile
 450 455 460

Arg Ile Asp Gln Lys Gly Lys Gly Ser Lys Gln Ile Glu Pro Thr Pro
 465 470 475 480

Val Ile Met Thr Thr Asn Glu Asn Ile Thr Val Val Arg Ile Gly Cys
 485 490 495

Glu Glu Arg Pro Glu His Thr Gln Pro Ile Arg Asp Arg Met Leu Asn
 500 505 510

Ile His Leu Thr His His Leu Pro Gly Asp Phe Gly Leu Val Asp Lys
 515 520 525

Asn Glu Trp Pro Met Ile Cys Ala Trp Leu Val Lys Asn Gly Tyr Gln
 530 535 540

Ser Thr Met Ala Ser Tyr Cys Ala Lys Trp Gly Lys Val Pro Asp Trp
 545 550 555 560

Ser Glu Asn Trp Ala Glu Pro Lys Val Pro Thr Pro Ile Asn Leu Leu
 565 570 575

Gly Ser Ala Arg Ser Pro Phe Thr Thr Pro Lys Ser Thr Pro Leu Ser
 580 585 590

Gln Asn Tyr Ala Leu Thr Pro Leu Ala Ser Asp Leu Glu Asp Leu Ala
 595 600 605

Leu Glu Pro Trp Ser Thr Pro Asn Thr Pro Val Ala Gly Thr Ala Glu
 610 615 620

Thr Gln Asn Thr Gly Glu Ala Gly Ser Lys Ala Cys Gln Asp Gly Gln
 625 630 635 640

Leu Ser Pro Thr Trp Ser Glu Ile Glu Glu Asp Leu Arg Ala Cys Phe
 645 650 655

Gly Ala Glu Pro Leu Lys Lys Asp Phe Ser Glu Pro Leu Asn Leu Asp
 660 665 670

<210> 3
 <211> 60
 <212> DNA
 <213> Part of Parvovirus NS1 Variant

<400> 3
gaagttgcta ttaaaactac acttaaagag ctggtgcata aaagagtaac ctcaccagag 60

<210> 4
<211> 2019
<212> DNA
<213> Parvovirus NS1 Variant

<400> 4
atggctggaa atgcttactc tgatgaagtt ttgggagcaa ccaactgggt aaaggaaaaa 60
agtaaccagg aagtgttctc atttgttttt aaaaatgaaa atgttcaact gaatggaaaa 120
gatatcggat ggaatagtta caaaaaagag ctgcaggagg acgagctgaa atctttacaa 180
cgaggagcgg aaactacttg ggaccaaaagc gaggacatgg aatgggaaac cacagtggat 240
gaaatgacca aaaagcaagt attcattttt gattcttttg ttaaaaaatg tttatttgaa 300
gtgcttaaca caaagaatat atttcctggg gatgttaatt ggtttgtgca acatgaatgg 360
ggaaaagacc aaggctggca ctgccatgta ctaattggag gaaaggactt tagtcaagct 420
caagggaaat ggtggagaag gcaactaaat gtttactgga gcagatgggt ggtaacagcc 480
tgtaatgtgc aactaacacc agctgaaaga attaaactaa gagaaatagc agaagacaat 540
gagtgggtta ctctacttac ttataagcat aagcaaacca aaaaagacta taccaagtgt 600
gttctttttg gaaacatgat tgcttactat tttttaacta aaaagaaaat aagcactagt 660
ccaccaagag acggagggcta ttttcttagc agtgactctg gctggaaaac taacttttta 720
aaagaaggcg agcgccatct agtgagcaaa ctatacactg atgacatgcg gccagaaacg 780
gttgaaacca cagtaaccac tgcgcaggaa actaagcgcg gcagaattca aactaaaaaa 840
gaagttgcta ttaaaactac acttaaagag ctggtgcata aaagagtaac ctcaccagag 900
gactggatga tgatgcagcc agacagttac attgaaatga tggctcaacc aggtggagaa 960
aacctgctga aaaatacgct agagatttgt aactaactc tagccagaac caaacagca 1020
tttgacttaa ttttagaaaa agctgaaacc agcaactaa ccaacttttc actgcctgac 1080
acaagaacct gcagaatttt tgcttttcat ggctggaact atgttaaagt ttgccatgct 1140
atgtgtgtg ttttaaacag acaaggaggc aaaagaaata ctgttttatt tcatggacca 1200
gccagcacag gcaaattctat tattgcacaa gccatagcac aagcagttgg caatgttggt 1260
tgctataatg cagccaatgt aaactttcca tttaatgact gtaccaacaa gaacttgatt 1320
tgggtagaag aagctggtaa ctttggacag caagtaaacc agtttaaagc catttgctct 1380
ggtcaaacta ttcgattga tcaaaaagga aaaggcagca aacagattga accaacacca 1440
gtcatcatga ccacaaatga gaacattaca gtggtcagaa taggctgcga agaaagacca 1500
gaacacactc aaccaatcag agacagaatg cttaacattc atctaacaca taccttgctt 1560
ggtgactttg gtttggttga caaaaatgaa tggcccatga tttgtgcttg gttggtaaag 1620
aatggttacc aatctacat ggcaagctac tgtgctaaat ggggcaaagt tcctgattgg 1680
tcagaaaact gggcggagcc aaaggtgcc aactctataa atttactagg ttcggcacgc 1740

```

tcaccattca cgacaccgaa aagtacgcct ctcagccaga actatgcact aactccactt 1800
gcatcggatc tcgaggacct ggcttttagag ccttggagca caccaaatac tcctgttgcg 1860
ggcactgcag aaaccagaa cactggggaa gctggttcca aagcctgcca agatgggtcaa 1920
ctgagcccaa cttggtcaga gatcgaggag gatttgagag cgtgcttcgg tgcggaaccg 1980
ttgaagaaag acttcagcga gccgctgaac ttggactaa 2019

```

```

<210> 5
<211> 20
<212> PRT
<213> Part of Parvovirus NS1 Variant

```

```
<400> 5
```

```

Glu Val Ala Ile Lys Thr Thr Leu Lys Glu Leu Val His Lys Arg Val
1          5          10          15

```

```

Thr Ser Pro Glu
          20

```

```

<210> 6
<211> 672
<212> PRT
<213> Parvovirus NS1 Variant

```

```
<400> 6
```

```

Met Ala Gly Asn Ala Tyr Ser Asp Glu Val Leu Gly Ala Thr Asn Trp
1          5          10          15

```

```

Leu Lys Glu Lys Ser Asn Gln Glu Val Phe Ser Phe Val Phe Lys Asn
          20          25          30

```

```

Glu Asn Val Gln Leu Asn Gly Lys Asp Ile Gly Trp Asn Ser Tyr Lys
          35          40          45

```

```

Lys Glu Leu Gln Glu Asp Glu Leu Lys Ser Leu Gln Arg Gly Ala Glu
          50          55          60

```

```

Thr Thr Trp Asp Gln Ser Glu Asp Met Glu Trp Glu Thr Thr Val Asp
65          70          75          80

```

```

Glu Met Thr Lys Lys Gln Val Phe Ile Phe Asp Ser Leu Val Lys Lys
          85          90          95

```

```

Cys Leu Phe Glu Val Leu Asn Thr Lys Asn Ile Phe Pro Gly Asp Val
          100          105          110

```

```

Asn Trp Phe Val Gln His Glu Trp Gly Lys Asp Gln Gly Trp His Cys
          115          120          125

```

```

His Val Leu Ile Gly Gly Lys Asp Phe Ser Gln Ala Gln Gly Lys Trp
          130          135          140

```

Trp Arg Arg Gln Leu Asn Val Tyr Trp Ser Arg Trp Leu Val Thr Ala
145 150 155 160

Cys Asn Val Gln Leu Thr Pro Ala Glu Arg Ile Lys Leu Arg Glu Ile
165 170 175

Ala Glu Asp Asn Glu Trp Val Thr Leu Leu Thr Tyr Lys His Lys Gln
180 185 190

Thr Lys Lys Asp Tyr Thr Lys Cys Val Leu Phe Gly Asn Met Ile Ala
195 200 205

Tyr Tyr Phe Leu Thr Lys Lys Lys Ile Ser Thr Ser Pro Pro Arg Asp
210 215 220

Gly Gly Tyr Phe Leu Ser Ser Asp Ser Gly Trp Lys Thr Asn Phe Leu
225 230 235 240

Lys Glu Gly Glu Arg His Leu Val Ser Lys Leu Tyr Thr Asp Asp Met
245 250 255

Arg Pro Glu Thr Val Glu Thr Thr Val Thr Thr Ala Gln Glu Thr Lys
260 265 270

Arg Gly Arg Ile Gln Thr Lys Lys Glu Val Ala Ile Lys Thr Thr Leu
275 280 285

Lys Glu Leu Val His Lys Arg Val Thr Ser Pro Glu Asp Trp Met Met
290 295 300

Met Gln Pro Asp Ser Tyr Ile Glu Met Met Ala Gln Pro Gly Gly Glu
305 310 315 320

Asn Leu Leu Lys Asn Thr Leu Glu Ile Cys Thr Leu Thr Leu Ala Arg
325 330 335

Thr Lys Thr Ala Phe Asp Leu Ile Leu Glu Lys Ala Glu Thr Ser Lys
340 345 350

Leu Thr Asn Phe Ser Leu Pro Asp Thr Arg Thr Cys Arg Ile Phe Ala
355 360 365

Phe His Gly Trp Asn Tyr Val Lys Val Cys His Ala Ile Cys Cys Val
370 375 380

Leu Asn Arg Gln Gly Gly Lys Arg Asn Thr Val Leu Phe His Gly Pro
385 390 395 400

Ala Ser Thr Gly Lys Ser Ile Ile Ala Gln Ala Ile Ala Gln Ala Val
405 410 415

Gly Asn Val Gly Cys Tyr Asn Ala Ala Asn Val Asn Phe Pro Phe Asn


```

      420              425              430
Asp Cys Thr Asn Lys Asn Leu Ile Trp Val Glu Glu Ala Gly Asn Phe
  435              440              445
Gly Gln Gln Val Asn Gln Phe Lys Ala Ile Cys Ser Gly Gln Thr Ile
  450              455              460
Arg Ile Asp Gln Lys Gly Lys Gly Ser Lys Gln Ile Glu Pro Thr Pro
  465              470              475              480
Val Ile Met Thr Thr Asn Glu Asn Ile Thr Val Val Arg Ile Gly Cys
  485              490              495
Glu Glu Arg Pro Glu His Thr Gln Pro Ile Arg Asp Arg Met Leu Asn
  500              505              510
Ile His Leu Thr His His Leu Pro Gly Asp Phe Gly Leu Val Asp Lys
  515              520              525
Asn Glu Trp Pro Met Ile Cys Ala Trp Leu Val Lys Asn Gly Tyr Gln
  530              535              540
Ser Thr Met Ala Ser Tyr Cys Ala Lys Trp Gly Lys Val Pro Asp Trp
  545              550              555              560
Ser Glu Asn Trp Ala Glu Pro Lys Val Pro Thr Pro Ile Asn Leu Leu
  565              570              575
Gly Ser Ala Arg Ser Pro Phe Thr Thr Pro Lys Ser Thr Pro Leu Ser
  580              585              590
Gln Asn Tyr Ala Leu Thr Pro Leu Ala Ser Asp Leu Glu Asp Leu Ala
  595              600              605
Leu Glu Pro Trp Ser Thr Pro Asn Thr Pro Val Ala Gly Thr Ala Glu
  610              615              620
Thr Gln Asn Thr Gly Glu Ala Gly Ser Lys Ala Cys Gln Asp Gly Gln
  625              630              635              640
Leu Ser Pro Thr Trp Ser Glu Ile Glu Glu Asp Leu Arg Ala Cys Phe
  645              650              655
Gly Ala Glu Pro Leu Lys Lys Asp Phe Ser Glu Pro Leu Asn Leu Asp
  660              665              670

```

```

<210> 7
<211> 60
<212> DNA
<213> Part of Parvovirus NS1 Variant
<400> 7

```

acaagagcct gcagaatttt tgcttttcat ggctggaact atgttaaagt ttgccatgct 60

<210> 8

<211> 2019

<212> DNA

<213> Parvovirus NS1 Variant

<400> 8

atggctggaa atgcttactc tgatgaagtt ttgggagcaa ccaactgggt aaaggaaaaa 60
 agtaaccagg aagtgtttctc atttgttttt aaaaatgaaa atgttcaact gaatggaaaa 120
 gatatcggat ggaatagtta caaaaaagag ctgcaggagg acgagctgaa atctttacaa 180
 cgaggagcgg aaactacttg ggaccaaagc gaggacatgg aatgggaaac cacagtggat 240
 gaaatgacca aaaagcaagt attcattttt gattcttttg ttaaaaaatg tttatttgaa 300
 gtgcttaaca caaagaatat atttcctggg gatgttaatt ggtttggtga acatgaatgg 360
 ggaaaagacc aaggctggca ctgccatgta ctaattggag gaaaggactt tagtcaagct 420
 caagggaaat ggtggagaag gcaactaaat gtttactgga gcagatgggt ggtaacagcc 480
 tgtaatgtgc aactaacacc agctgaaaga attaaactaa gagaaatagc agaagacaat 540
 gagtggggta ctctacttac ttataagcat aagcaaacca aaaaagacta taccaagtgt 600
 gttctttttt gaaacatgat tgcttactat tttttaacta aaaagaaaat aagcactagt 660
 ccaccaagag acggaggcta ttttcttagc agtgactctg gctggaaaac taacttttta 720
 aaagaaggcg agcgccatct agtgagcaaa ctatacactg atgacatgcg gccagaaacg 780
 gttgaaacca cagtaaccac tgcgcaggaa actaagcgcg gcagaattca aactaaaaaa 840
 gaagtttcta ttaaaactac acttaaagag ctggtgcata aaagagtaac ctcaccagag 900
 gactggatga tgatgcagcc agacagttac attgaaatga tggctcaacc aggtggagaa 960
 aacctgctga aaaatacgct agagatttgt acactaactc tagccagaac caaaacagca 1020
 tttgacttaa ttttagaaaa agctgaaacc agcaactaa ccaacttttc actgcctgac 1080
 acaagagcct gcagaatttt tgcttttcat ggctggaact atgttaaagt ttgccatgct 1140
 atttgctgtg ttttaaacag acaaggaggc aaaagaaata ctgttttatt tcatggacca 1200
 gccagcacag gcaaatctat tattgcacaa gccatagcac aagcagttgg caatgttggt 1260
 tgctataatg cagccaatgt aaactttcca tttaatgact gtaccaacaa gaacttgatt 1320
 tgggtagaag aagctggtaa ctttggacag caagtaaacc agtttaaagc catttgctct 1380
 ggtcaacta ttcgcattga tcaaaaagga aaaggcagca aacagattga accaacacca 1440
 gtcatcatga ccacaaatga gaacattaca gtggtcagaa taggctgcga agaaagacca 1500
 gaacacactc aaccaatcag agacagaatg cttaacattc atctaacaca taccttgctt 1560
 ggtgactttg gtttggttga caaaaatgaa tggcccatga tttgtgcttg gttggttaaag 1620
 aatggttacc aatctaccat ggcaagctac tgtgctaaat ggggcaaagt tcctgattgg 1680
 tcagaaaact gggcgagacc aaaggtgcca actctataa atttactagg ttcggcacgc 1740
 tcaccattca cgacaccgaa aagtacgcct ctgagccaga actatgcact aactccactt 1800

```

gcatcgatc tcgaggacct ggcttttagag ccttgagca caccaaatac tcctgttgcg 1860
ggcactgcag aaaccagaa cactggggaa gctggttcca aagcctgcca agatgggtcaa 1920
ctgagcccaa cttggtcaga gatcgaggag gatttgagag cgtgcttcgg tgcggaaccg 1980
ttgaagaaag acttcagcga gccgctgaac ttgactaa 2019

```

```

<210> 9
<211> 20
<212> PRT
<213> Part of Parvovirus NS1 Variant

```

```
<400> 9
```

```

Thr Arg Ala Cys Arg Ile Phe Ala Phe His Gly Trp Asn Tyr Val Lys
1      5      10      15

```

```

Val Cys His Ala
20

```

```

<210> 10
<211> 672
<212> PRT
<213> Parvovirus NS1 Variant

```

```
<400> 10
```

```

Met Ala Gly Asn Ala Tyr Ser Asp Glu Val Leu Gly Ala Thr Asn Trp
1      5      10      15

```

```

Leu Lys Glu Lys Ser Asn Gln Glu Val Phe Ser Phe Val Phe Lys Asn
20      25      30

```

```

Glu Asn Val Gln Leu Asn Gly Lys Asp Ile Gly Trp Asn Ser Tyr Lys
35      40      45

```

```

Lys Glu Leu Gln Glu Asp Glu Leu Lys Ser Leu Gln Arg Gly Ala Glu
50      55      60

```

```

Thr Thr Trp Asp Gln Ser Glu Asp Met Glu Trp Glu Thr Thr Val Asp
65      70      75      80

```

```

Glu Met Thr Lys Lys Gln Val Phe Ile Phe Asp Ser Leu Val Lys Lys
85      90      95

```

```

Cys Leu Phe Glu Val Leu Asn Thr Lys Asn Ile Phe Pro Gly Asp Val
100     105     110

```

```

Asn Trp Phe Val Gln His Glu Trp Gly Lys Asp Gln Gly Trp His Cys
115     120     125

```

```

His Val Leu Ile Gly Gly Lys Asp Phe Ser Gln Ala Gln Gly Lys Trp
130     135     140

```

```

Trp Arg Arg Gln Leu Asn Val Tyr Trp Ser Arg Trp Leu Val Thr Ala
145     150     155     160

```

Cys Asn Val Gln Leu Thr Pro Ala Glu Arg Ile Lys Leu Arg Glu Ile
 165 170 175

Ala Glu Asp Asn Glu Trp Val Thr Leu Leu Thr Tyr Lys His Lys Gln
 180 185 190

Thr Lys Lys Asp Tyr Thr Lys Cys Val Leu Phe Gly Asn Met Ile Ala
 195 200 205

Tyr Tyr Phe Leu Thr Lys Lys Lys Ile Ser Thr Ser Pro Pro Arg Asp
 210 215 220

Gly Gly Tyr Phe Leu Ser Ser Asp Ser Gly Trp Lys Thr Asn Phe Leu
 225 230 235 240

Lys Glu Gly Glu Arg His Leu Val Ser Lys Leu Tyr Thr Asp Asp Met
 245 250 255

Arg Pro Glu Thr Val Glu Thr Thr Val Thr Thr Ala Gln Glu Thr Lys
 260 265 270

Arg Gly Arg Ile Gln Thr Lys Lys Glu Val Ser Ile Lys Thr Thr Leu
 275 280 285

Lys Glu Leu Val His Lys Arg Val Thr Ser Pro Glu Asp Trp Met Met
 290 295 300

Met Gln Pro Asp Ser Tyr Ile Glu Met Met Ala Gln Pro Gly Gly Glu
 305 310 315 320

Asn Leu Leu Lys Asn Thr Leu Glu Ile Cys Thr Leu Thr Leu Ala Arg
 325 330 335

Thr Lys Thr Ala Phe Asp Leu Ile Leu Glu Lys Ala Glu Thr Ser Lys
 340 345 350

Leu Thr Asn Phe Ser Leu Pro Asp Thr Arg Ala Cys Arg Ile Phe Ala
 355 360 365

Phe His Gly Trp Asn Tyr Val Lys Val Cys His Ala Ile Cys Cys Val
 370 375 380

Leu Asn Arg Gln Gly Gly Lys Arg Asn Thr Val Leu Phe His Gly Pro
 385 390 395 400

Ala Ser Thr Gly Lys Ser Ile Ile Ala Gln Ala Ile Ala Gln Ala Val
 405 410 415

Gly Asn Val Gly Cys Tyr Asn Ala Ala Asn Val Asn Phe Pro[^] Phe Asn
 420 425 430

Asp Cys Thr Asn Lys Asn Leu Ile Trp Val Glu Glu Ala Gly Asn Phe
 435 440 445

Gly Gln Gln Val Asn Gln Phe Lys Ala Ile Cys Ser Gly Gln Thr Ile
 450 455 460

Arg Ile Asp Gln Lys Gly Lys Gly Ser Lys Gln Ile Glu Pro Thr Pro
 465 470 475 480

Val Ile Met Thr Thr Asn Glu Asn Ile Thr Val Val Arg Ile Gly Cys
 485 490 495

Glu Glu Arg Pro Glu His Thr Gln Pro Ile Arg Asp Arg Met Leu Asn
 500 505 510

Ile His Leu Thr His His Leu Pro Gly Asp Phe Gly Leu Val Asp Lys
 515 520 525

Asn Glu Trp Pro Met Ile Cys Ala Trp Leu Val Lys Asn Gly Tyr Gln
 530 535 540

Ser Thr Met Ala Ser Tyr Cys Ala Lys Trp Gly Lys Val Pro Asp Trp
 545 550 555 560

Ser Glu Asn Trp Ala Glu Pro Lys Val Pro Thr Pro Ile Asn Leu Leu
 565 570 575

Gly Ser Ala Arg Ser Pro Phe Thr Thr Pro Lys Ser Thr Pro Leu Ser
 580 585 590

Gln Asn Tyr Ala Leu Thr Pro Leu Ala Ser Asp Leu Glu Asp Leu Ala
 595 600 605

Leu Glu Pro Trp Ser Thr Pro Asn Thr Pro Val Ala Gly Thr Ala Glu
 610 615 620

Thr Gln Asn Thr Gly Glu Ala Gly Ser Lys Ala Cys Gln Asp Gly Gln
 625 630 635 640

Leu Ser Pro Thr Trp Ser Glu Ile Glu Glu Asp Leu Arg Ala Cys Phe
 645 650 655

Gly Ala Glu Pro Leu Lys Lys Asp Phe Ser Glu Pro Leu Asn Leu Asp
 660 665 670

<210> 11
 <211> 60
 <212> DNA
 <213> Part of Parvovirus NS1 Variant

<400> 11
 atttgcgtgtg ttttaaacag acaaggaggc aaaagaaatg ctgttttatt tcatggacca 60

<210> 12
 <211> 2019
 <212> DNA

<213> Parvovirus NSI Variant

<400> 12
 atggctggaa atgcttactc tgatgaagtt ttgggagcaa ccaactgggt aaaggaaaaa 60
 agtaaccagg aagtgttctc atttgttttt aaaaatgaaa atgttcaact gaatggaaaa 120
 gatatcggat ggaatagtta caaaaaagag ctgcaggagg acgagctgaa atctttacaa 180
 cgaggagcgg aaactacttg ggaccaaagc gaggacatgg aatgggaaac cacagtggat 240
 gaaatgacca aaaagcaagt attcattttt gattcttttg ttaaaaaatg tttatttgaa 300
 gtgcttaaca caaagaatat atttcctggg gatgttaatt ggtttggtga acatgaatgg 360
 ggaaaagacc aaggctggca ctgccatgta ctaattggag gaaaggactt tagtcaagct 420
 caagggaaat ggtggagaag gcaactaaat gtttactgga gcagatgggt ggtaacagcc 480
 tgtaatgtgc aactaacacc agctgaaaga attaaactaa gagaaatagc agaagacaat 540
 gagtgggtta ctctacttac ttataagcat aagcaaacca aaaaagacta taccaagtgt 600
 gttctttttg gaaacatgat tgcttactat tttttaacta aaaagaaaat aagcactagt 660
 ccaccaagag acggagggcta ttttcttagc agtgactctg gctggaaaac taacttttta 720
 aaagaaggcg agcgccatct agtgagcaaa ctatacactg atgacatgcg gccagaaacg 780
 gttgaaacca cagtaaccac tgcgcaggaa actaagcgcg gcagaattca aactaaaaaa 840
 gaagtttcta ttaaaactac acttaaagag ctggtgcata aaagagtaac ctcaccagag 900
 gactggatga tgatgcagcc agacagtac attgaaatga tggctcaacc aggtggagaa 960
 aacctgctga aaaatacgct agagatttgt acactaactc tagccagaac caaacagca 1020
 tttgacttaa ttttagaaaa agctgaaacc agcaactaa ccaacttttc actgcctgac 1080
 acaagaacct gcagaatttt tgcttttcat ggctggaact atgttaaagt ttgccatgct 1140
 atttgctgtg ttttaaacag acaaggaggc aaagaaatg ctgttttatt tcatggacca 1200
 gccagcacag gcaaatctat tattgcacaa gccatagcac aagcagttgg caatgttggt 1260
 tgctataatg cagccaatgt aaactttcca tttaatgact gtaccaacaa gaacttgatt 1320
 tgggtagaag aagctggtaa ctttgagcag caagtaaacc agtttaaagc catttgctct 1380
 ggtcaaacta ttcgattga tcaaaaagga aaaggcagca aacagattga accaacacca 1440
 gtcacatga ccacaaatga gaacattaca gtggtcagaa taggctgcga agaaagacca 1500
 gaacacactc aaccaatcag agacagaatg cttaacattc atctaacaca taccttgctt 1560
 ggtgactttg gtttggttga caaaaatgaa tggcccatga tttgtgcttg gttggtaaag 1620
 aatggttacc aatctacat ggcaagctac tgtgctaaat ggggcaaagt tcctgattgg 1680
 tcagaaaact gggcgagcc aaaggtgcc actcctataa atttactagg ttcggcacgc 1740
 tcaccattca cgacaccgaa agtacgcct ctcagccaga actatgcact aactccactt 1800
 gcatcggatc tcgaggacct ggctttagag ccttgagca caccaaatac tcctgttgcg 1860

ggcactgcag aaaccagaa cactggggaa gctggttcca aagcctgcca agatgggtcaa 1920
 ctgagcccaa cttggtcaga gatcgaggag gatttgagag cgtgcttcgg tgcggaaccg 1980
 ttgaagaag acttcagcga gccgctgaac ttggactaa 2019

<210> 13
 <211> 20
 <212> PRT
 <213> Part of Parvovirus NS1 Variant

<400> 13

Ile Cys Cys Val Leu Asn Arg Gln Gly Gly Lys Arg Asn Ala Val Leu
 1 5 10 15

Phe His Gly Pro
 20

<210> 14
 <211> 672
 <212> PRT
 <213> Parvovirus NS1 Variant

<400> 14

Met Ala Gly Asn Ala Tyr Ser Asp Glu Val Leu Gly Ala Thr Asn Trp
 1 5 10 15

Leu Lys Glu Lys Ser Asn Gln Glu Val Phe Ser Phe Val Phe Lys Asn
 20 25 30

Glu Asn Val Gln Leu Asn Gly Lys Asp Ile Gly Trp Asn Ser Tyr Lys
 35 40 45

Lys Glu Leu Gln Glu Asp Glu Leu Lys Ser Leu Gln Arg Gly Ala Glu
 50 55 60

Thr Thr Trp Asp Gln Ser Glu Asp Met Glu Trp Glu Thr Thr Val Asp
 65 70 75 80

Glu Met Thr Lys Lys Gln Val Phe Ile Phe Asp Ser Leu Val Lys Lys
 85 90 95

Cys Leu Phe Glu Val Leu Asn Thr Lys Asn Ile Phe Pro Gly Asp Val
 100 105 110

Asn Trp Phe Val Gln His Glu Trp Gly Lys Asp Gln Gly Trp His Cys
 115 120 125

His Val Leu Ile Gly Gly Lys Asp Phe Ser Gln Ala Gln Gly Lys Trp
 130 135 140

Trp Arg Arg Gln Leu Asn Val Tyr Trp Ser Arg Trp Leu Val Thr Ala
 145 150 155 160

Cys Asn Val Gln Leu Thr Pro Ala Glu Arg Ile Lys Leu Arg Glu Ile
 165 170 175

Ala Glu Asp Asn Glu Trp Val Thr Leu Leu Thr Tyr Lys His Lys Gln
 180 185 190

Thr Lys Lys Asp Tyr Thr Lys Cys Val Leu Phe Gly Asn Met Ile Ala
 195 200 205

Tyr Tyr Phe Leu Thr Lys Lys Lys Ile Ser Thr Ser Pro Pro Arg Asp
 210 215 220

Gly Gly Tyr Phe Leu Ser Ser Asp Ser Gly Trp Lys Thr Asn Phe Leu
 225 230 235 240

Lys Glu Gly Glu Arg His Leu Val Ser Lys Leu Tyr Thr Asp Asp Met
 245 250 255

Arg Pro Glu Thr Val Glu Thr Thr Val Thr Thr Ala Gln Glu Thr Lys
 260 265 270

Arg Gly Arg Ile Gln Thr Lys Lys Glu Val Ser Ile Lys Thr Thr Leu
 275 280 285

Lys Glu Leu Val His Lys Arg Val Thr Ser Pro Glu Asp Trp Met Met
 290 295 300

Met Gln Pro Asp Ser Tyr Ile Glu Met Met Ala Gln Pro Gly Gly Glu
 305 310 315 320

Asn Leu Leu Lys Asn Thr Leu Glu Ile Cys Thr Leu Thr Leu Ala Arg
 325 330 335

Thr Lys Thr Ala Phe Asp Leu Ile Leu Glu Lys Ala Glu Thr Ser Lys
 340 345 350

Leu Thr Asn Phe Ser Leu Pro Asp Thr Arg Thr Cys Arg Ile Phe Ala
 355 360 365

Phe His Gly Trp Asn Tyr Val Lys Val Cys His Ala Ile Cys Cys Val
 370 375 380

Leu Asn Arg Gln Gly Gly Lys Arg Asn Ala Val Leu Phe His Gly Pro
 385 390 395 400

Ala Ser Thr Gly Lys Ser Ile Ile Ala Gln Ala Ile Ala Gln Ala Val
 405 410 415

Gly Asn Val Gly Cys Tyr Asn Ala Ala Asn Val Asn Phe Pro Phe Asn
 420 425 430

Asp Cys Thr Asn Lys Asn Leu Ile Trp Val Glu Glu Ala Gly Asn Phe

435

440

445

Gly Gln Gln Val Asn Gln Phe Lys Ala Ile Cys Ser Gly Gln Thr Ile
 450 455 460

Arg Ile Asp Gln Lys Gly Lys Gly Ser Lys Gln Ile Glu Pro Thr Pro
 465 470 475 480

Val Ile Met Thr Thr Asn Glu Asn Ile Thr Val Val Arg Ile Gly Cys
 485 490 495

Glu Glu Arg Pro Glu His Thr Gln Pro Ile Arg Asp Arg Met Leu Asn
 500 505 510

Ile His Leu Thr His His Leu Pro Gly Asp Phe Gly Leu Val Asp Lys
 515 520 525

Asn Glu Trp Pro Met Ile Cys Ala Trp Leu Val Lys Asn Gly Tyr Gln
 530 535 540

Ser Thr Met Ala Ser Tyr Cys Ala Lys Trp Gly Lys Val Pro Asp Trp
 545 550 555 560

Ser Glu Asn Trp Ala Glu Pro Lys Val Pro Thr Pro Ile Asn Leu Leu
 565 570 575

Gly Ser Ala Arg Ser Pro Phe Thr Thr Pro Lys Ser Thr Pro Leu Ser
 580 585 590

Gln Asn Tyr Ala Leu Thr Pro Leu Ala Ser Asp Leu Glu Asp Leu Ala
 595 600 605

Leu Glu Pro Trp Ser Thr Pro Asn Thr Pro Val Ala Gly Thr Ala Glu
 610 615 620

Thr Gln Asn Thr Gly Glu Ala Gly Ser Lys Ala Cys Gln Asp Gly Gln
 625 630 635 640

Leu Ser Pro Thr Trp Ser Glu Ile Glu Glu Asp Leu Arg Ala Cys Phe
 645 650 655

Gly Ala Glu Pro Leu Lys Lys Asp Phe Ser Glu Pro Leu Asn Leu Asp
 660 665 670

<210> 15
 <211> 60
 <212> DNA
 <213> Part of Parvovirus NS1 Variant

<400> 15
 ggtcaagcta ttcgattga tcaaaaagga aaaggcagca aacagattga accaacacca 60

<210> 16

<211> 2019
 <212> DNA
 <213> Parvovirus NS1 Variant

<400> 16
 atggctggaa atgcttactc tgatgaagtt ttgggagcaa ccaactgggt aaaggaaaaa 60
 agtaaccagg aagtgttctc atttgttttt aaaaatgaaa atgttcaact gaatggaaaa 120
 gatatcggat ggaatagtta caaaaaagag ctgcaggagg acgagctgaa atctttacaa 180
 cgaggagcgg aaactacttg ggaccaaagc gaggacatgg aatgggaaac cacagtggat 240
 gaaatgacca aaaagcaagt attcattttt gattcttttg ttaaaaaatg tttatttgaa 300
 gtgcttaaca caaagaatat atttcctggt gatgttaatt ggtttggtga acatgaatgg 360
 ggaaaagacc aaggctggca ctgccatgta ctaattggag gaaaggactt tagtcaagct 420
 caagggaaat ggtggagaag gcaactaaat gtttactgga gcagatgggt ggtaacagcc 480
 tgtaatgtgc aactaacacc agctgaaaga attaaactaa gagaaatagc agaagacaat 540
 gagtgggtta ctctacttac ttataagcat aagcaaacca aaaaagacta taccaagtgt 600
 gttctttttg gaaacatgat tgcttactat tttttaacta aaaagaaaat aagcactagt 660
 ccaccaagag acggaggcta ttttcttagc agtgactctg gctggaaaac taacttttta 720
 aaagaaggcg agcgccatct agtgagcaaa ctatacactg atgacatgcg gccagaaacg 780
 gttgaaacca cagtaaccac tgcgcaggaa actaagcgcg gcagaattca aactaaaaaa 840
 gaagtttcta ttaaaactac acttaaagag ctggtgcata aaagagtaac ctcaccagag 900
 gactggatga tgatgcagcc agacagttac attgaaatga tggctcaacc aggtggagaa 960
 aacctgctga aaaatacgtc agagatttgt aactaactc tagccagaac caaaacagca 1020
 tttgacttaa ttttagaaaa agctgaaacc agcaactaa ccaacttttc actgcctgac 1080
 acaagaacct gcagaatttt tgcttttcat ggctggaact atgttaaagt ttgccatgct 1140
 atttgctgtg ttttaaacag acaaggaggc aaaagaaata ctgttttatt tcatggacca 1200
 gccagcacag gcaaatctat tattgcacaa gccatagcac aagcagttgg caatgttggt 1260
 tgctataatg cagccaatgt aaactttcca tttaatgact gtaccaacaa gaacttgatt 1320
 tgggtagaag aagctggtaa ctttgagcag caagtaaacc agtttaaagc catttgctct 1380
 ggtcaagcta ttcgattga tcaaaaagga aaaggcagca aacagattga accaacacca 1440
 gtcacatga ccacaaatga gaacattaca gtggtcagaa taggctgcga agaaagacca 1500
 gaacacactc aaccaatcag agacagaatg cttaacattc atctaacaca taccttgctt 1560
 ggtgactttg gtttggttga caaaaatgaa tggcccatga tttgtgcttg gttggtaaag 1620
 aatggttacc aatctacat ggcaagctac tgtgctaaat ggggcaaagt tcctgattgg 1680
 tcagaaaact gggcgagacc aaaggtgcc aactctataa atttactagg ttcggcacgc 1740
 tcaccattca cgacaccgaa aagtacgcct ctgagccaga actatgcact aactccactt 1800
 gcatcggatc tcgaggacct ggcttttagag ctttgagca caccaaatac tcctgttgcg 1860
 ggcactgcag aaaccagaa cactggggaa gctggttcca aagcctgcc agatggtcaa 1920

ctgagcccaa cttggtcaga gatcgaggag gatttgagag cgtgcttcgg tgcggaaccg 1980
 ttgaagaaag acttcagcga gccgctgaac ttggactaa 2019

<210> 17
 <211> 20
 <212> PRT
 <213> Part of Parvovirus NS1 Variant

<400> 17

Gly Gln Ala Ile Arg Ile Asp Gln Lys Gly Lys Gly Ser Lys Gln Ile
 1 5 10 15

Glu Pro Thr Pro
 20

<210> 18
 <211> 672
 <212> PRT
 <213> Parvovirus NS1 Variant

<400> 18

Met Ala Gly Asn Ala Tyr Ser Asp Glu Val Leu Gly Ala Thr Asn Trp
 1 5 10 15

Leu Lys Glu Lys Ser Asn Gln Glu Val Phe Ser Phe Val Phe Lys Asn
 20 25 30

Glu Asn Val Gln Leu Asn Gly Lys Asp Ile Gly Trp Asn Ser Tyr Lys
 35 40 45

Lys Glu Leu Gln Glu Asp Glu Leu Lys Ser Leu Gln Arg Gly Ala Glu
 50 55 60

Thr Thr Trp Asp Gln Ser Glu Asp Met Glu Trp Glu Thr Thr Val Asp
 65 70 75 80

Glu Met Thr Lys Lys Gln Val Phe Ile Phe Asp Ser Leu Val Lys Lys
 85 90 95

Cys Leu Phe Glu Val Leu Asn Thr Lys Asn Ile Phe Pro Gly Asp Val
 100 105 110

Asn Trp Phe Val Gln His Glu Trp Gly Lys Asp Gln Gly Trp His Cys
 115 120 125

His Val Leu Ile Gly Gly Lys Asp Phe Ser Gln Ala Gln Gly Lys Trp
 130 135 140

Trp Arg Arg Gln Leu Asn Val Tyr Trp Ser Arg Trp Leu Val Thr Ala
 145 150 155 160

Cys Asn Val Gln Leu Thr Pro Ala Glu Arg Ile Lys Leu Arg Glu Ile
 165 170 175

Ala Glu Asp Asn Glu Trp Val Thr Leu Leu Thr Tyr Lys His Lys Gln
 180 185 190

Thr Lys Lys Asp Tyr Thr Lys Cys Val Leu Phe Gly Asn Met Ile Ala
 195 200 205

Tyr Tyr Phe Leu Thr Lys Lys Lys Ile Ser Thr Ser Pro Pro Arg Asp
 210 215 220

Gly Gly Tyr Phe Leu Ser Ser Asp Ser Gly Trp Lys Thr Asn Phe Leu
 225 230 235 240

Lys Glu Gly Glu Arg His Leu Val Ser Lys Leu Tyr Thr Asp Asp Met
 245 250 255

Arg Pro Glu Thr Val Glu Thr Thr Val Thr Thr Ala Gln Glu Thr Lys
 260 265 270

Arg Gly Arg Ile Gln Thr Lys Lys Glu Val Ser Ile Lys Thr Thr Leu
 275 280 285

Lys Glu Leu Val His Lys Arg Val Thr Ser Pro Glu Asp Trp Met Met
 290 295 300

Met Gln Pro Asp Ser Tyr Ile Glu Met Met Ala Gln Pro Gly Gly Glu
 305 310 315 320

Asn Leu Leu Lys Asn Thr Leu Glu Ile Cys Thr Leu Thr Leu Ala Arg
 325 330 335

Thr Lys Thr Ala Phe Asp Leu Ile Leu Glu Lys Ala Glu Thr Ser Lys
 340 345 350

Leu Thr Asn Phe Ser Leu Pro Asp Thr Arg Thr Cys Arg Ile Phe Ala
 355 360 365

Phe His Gly Trp Asn Tyr Val Lys Val Cys His Ala Ile Cys Cys Val
 370 375 380

Leu Asn Arg Gln Gly Gly Lys Arg Asn Thr Val Leu Phe His Gly Pro
 385 390 395 400

Ala Ser Thr Gly Lys Ser Ile Ile Ala Gln Ala Ile Ala Gln Ala Val
 405 410 415

Gly Asn Val Gly Cys Tyr Asn Ala Ala Asn Val Asn Phe Pro Phe Asn
 420 425 430

Asp Cys Thr Asn Lys Asn Leu Ile Trp Val Glu Glu Ala Gly Asn Phe
 435 440 445

Gly Gln Gln Val Asn Gln Phe Lys Ala Ile Cys Ser Gly Gln Ala Ile
 450 455 460

Arg Ile Asp Gln Lys Gly Lys Gly Ser Lys Gln Ile Glu Pro Thr Pro
 465 470 475 480

Val Ile Met Thr Thr Asn Glu Asn Ile Thr Val Val Arg Ile Gly Cys
 485 490 495

Glu Glu Arg Pro Glu His Thr Gln Pro Ile Arg Asp Arg Met Leu Asn
 500 505 510

Ile His Leu Thr His His Leu Pro Gly Asp Phe Gly Leu Val Asp Lys
 515 520 525

Asn Glu Trp Pro Met Ile Cys Ala Trp Leu Val Lys Asn Gly Tyr Gln
 530 535 540

Ser Thr Met Ala Ser Tyr Cys Ala Lys Trp Gly Lys Val Pro Asp Trp
 545 550 555 560

Ser Glu Asn Trp Ala Glu Pro Lys Val Pro Thr Pro Ile Asn Leu Leu
 565 570 575

Gly Ser Ala Arg Ser Pro Phe Thr Thr Pro Lys Ser Thr Pro Leu Ser
 580 585 590

Gln Asn Tyr Ala Leu Thr Pro Leu Ala Ser Asp Leu Glu Asp Leu Ala
 595 600 605

Leu Glu Pro Trp Ser Thr Pro Asn Thr Pro Val Ala Gly Thr Ala Glu
 610 615 620

Thr Gln Asn Thr Gly Glu Ala Gly Ser Lys Ala Cys Gln Asp Gly Gln
 625 630 635 640

Leu Ser Pro Thr Trp Ser Glu Ile Glu Glu Asp Leu Arg Ala Cys Phe
 645 650 655

Gly Ala Glu Pro Leu Lys Lys Asp Phe Ser Glu Pro Leu Asn Leu Asp
 660 665 670